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L4: Entry 1 of 1

File: PGPB

Oct 3, 2002

DOCUMENT-IDENTIFIER: US 20020142108 A1

TITLE: Liquid crystal compounds, liquid crystal medium and liquid crystal display

Detail Description Table CWU (21):

| | | | | | | | |
|------|-----------------------|----------------------|----------|------|---------|------|----------|
| 25 | Compound/Abbreviation | Concentration/mass-% | PTG-5-S | 10.0 | PTU-3-S | 15.0 | PTU-4O-S |
| 10.0 | PVG-5-S | 10.0 | PGU-3-S | 10.0 | PPU-3-S | 5.0 | PPU-4-S |
| 5.0 | PPU-5-S | 5.0 | PGIP-3-N | 15.0 | PPYP-4N | 15.0 | .SIGMA. |
| | | | | | | | 100.0 |

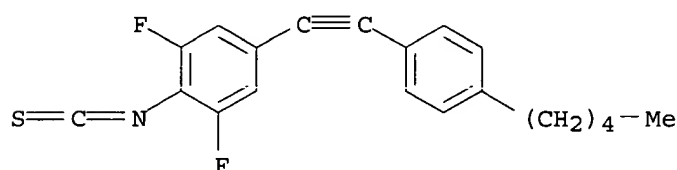
Detail Description Table CWU (23):

| | | | | | | | |
|------|-----------------------|----------------------|----------|------|---------|------|----------|
| 27 | Compound/Abbreviation | Concentration/mass-% | PTG-5-S | 10.0 | PTU-3-S | 13.0 | PTU-4O-S |
| 10.0 | PVG-5-S | 11.0 | PGU-3-S | 10.0 | PPU-3-S | 5.0 | PPU-4-S |
| 5.0 | PPU-5-S | 5.0 | PGIP-3-N | 12.0 | PPYP-4N | 13.0 | PVG-V-S |
| 6.0 | | | | | | | .SIGMA. |
| | | | | | | | 100.0 |

RN 313472-50-3 REGISTRY
 CN Benzene, 1,3-difluoro-2-isothiocyanato-5-[(4-pentylphenyl)ethynyl]- (9CI)
 (CA INDEX NAME)
 FS 3D CONCORD
 MF C20 H17 F2 N S
 SR CA
 LC STN Files: CA, CAPLUS, USPATFULL

Ring System Data

| Elemental Analysis EA | Elemental Sequence ES | Size of the Rings SZ | Ring System Formula RF | Ring Identifier RID | RID Occurrence Count |
|-----------------------------|-----------------------------|----------------------------|------------------------------|---------------------------|----------------------------|
| ===== | ===== | ===== | ===== | ===== | ===== |
| C6 | C6 | 6 | C6 | 46.150.18 | 2 |



Calculated Properties (CALC)

| PROPERTY (CODE) | VALUE | CONDITION | NOTE |
|----------------------------|--------------------|------------|---------|
| ===== | ===== | ===== | ===== |
| Bioconc. Factor (BCF) | 1396095 | pH 1 | (1) ACD |
| Bioconc. Factor (BCF) | 1396095 | pH 4 | (1) ACD |
| Bioconc. Factor (BCF) | 1396095 | pH 7 | (1) ACD |
| Bioconc. Factor (BCF) | 1396095 | pH 8 | (1) ACD |
| Bioconc. Factor (BCF) | 1396095 | pH 10 | (1) ACD |
| Boiling Point (BP) | 450.7+/-35.0 deg C | 760.0 Torr | (1) ACD |
| Enthalpy of Vap. (HVAP) | 68.24+/-3.0 kJ/mol | | (1) ACD |
| Flash Point (FP) | 226.4+/-46.7 deg C | | (1) ACD |
| H acceptors (HAC) | 1 | | (1) ACD |
| H donors (HD) | 0 | | (1) ACD |
| Koc (KOC) | 871159 | pH 1 | (1) ACD |
| Koc (KOC) | 871159 | pH 4 | (1) ACD |
| Koc (KOC) | 871159 | pH 7 | (1) ACD |
| Koc (KOC) | 871159 | pH 8 | (1) ACD |
| Koc (KOC) | 871159 | pH 10 | (1) ACD |
| logD (LOGD) | 8.39 | pH 1 | (1) ACD |
| logD (LOGD) | 8.39 | pH 4 | (1) ACD |
| logD (LOGD) | 8.39 | pH 7 | (1) ACD |
| logD (LOGD) | 8.39 | pH 8 | (1) ACD |
| logD (LOGD) | 8.39 | pH 10 | (1) ACD |
| logP (LOGP) | 8.388+/-0.512 | | (1) ACD |
| Molar Solubility (SLB.MOL) | <0.01 mol/L | pH 1 | (1) ACD |
| Molar Solubility (SLB.MOL) | <0.01 mol/L | pH 4 | (1) ACD |
| Molar Solubility (SLB.MOL) | <0.01 mol/L | pH 7 | (1) ACD |
| Molar Solubility (SLB.MOL) | <0.01 mol/L | pH 8 | (1) ACD |
| Molar Solubility (SLB.MOL) | <0.01 mol/L | pH 10 | (1) ACD |
| Molecular Weight (MW) | 341.42 | | (1) ACD |
| Vapor Pressure (VP) | 6.87E-08 Torr | 25.0 deg C | (1) ACD |

(1) Calculated using Advanced Chemistry Development (ACD) Software Solaris

4 REFERENCES IN FILE CA (1957 TO DATE)
 1 REFERENCES TO NON-SPECIFIC DERIVATIVES IN FILE CA
 4 REFERENCES IN FILE CAPLUS (1957 TO DATE)

REFERENCE 1

AN 136:110201 CA
 TI Liquid crystal compound, nematic liquid crystal mixture, and polymer dispersion liquid crystal display
 IN Poetsch, Eike; Meyer, Volker; Krause, Joachim; Manabe, Atsutaka
 PA Merck Patent G.M.B.H., Germany
 SO Jpn. Kokai Tokkyo Koho, 40 pp.
 CODEN: JKXXAF
 DT Patent
 LA Japanese
 IC ICM C09K019-42
 ICS C09K019-12; C09K019-16; C09K019-30; G02F001-13; G02F001-1334
 CC 74-13 (Radiation Chemistry, Photochemistry, and Photographic and Other Reprographic Processes)
 Section cross-reference(s): 75

FAN.CNT 1

| | PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|------|---|-------------|-------------|-----------------|-------------|
| PI | JP 2002012871 | A2 | 20020115 | JP 2001-137750 | 20010508 |
| PRAI | EP 2000-109163 | | 20000508 | | |
| AB | The invention relates to a nematic liq. crystal mixt. contg. a pos. anisotropic compd.(s) showing .DELTA.n of .gtoreq.0.30 (at 20.degree., 589.3 nm) represented by R1-A11-Z11-[A12-Z12]n-A13-NCS (R1 = C1-12-alky, Cl, OCF3, CN, NCS, F; Z11, Z12 = trans-CH:CH-, -CH:CF-, -CF:CH-, -CF:CF-, single bond; A11 = trans-1,4-cyclohexylene, 1,4-phenylene, 1,4-phenylene with F-substituent(s); A12, A13 = 1,4-phenylene, 1,4-phenylene with F-substituent(s); n = 0, 1) and a pos. anisotropic compd.(s) represented by R2-[A21]n-A22-A23-X2 (R2 = C1-12-alky, Cl, OCF3, CN, NCS, F; Z11, Z12 = trans-CH:CH-, -CH:CF-, -CF:CH-, -CF:CF-, single bond; A21 = trans-1,4-cyclohexylene, 1,4-phenylene, 1,4-phenylene with F-substituent(s); A22, A23 = 1,4-phenylene, 1,4-phenylene with F-substituent(s); X2 = CN, F, Cl; n = 0, 1). The liq. crystal mixt., showing wide-nematic-phase temp. ranges and low viscosity, is esp. suitable for (holog.) polymer dispersed liq. crystal displays. | | | | |
| ST | nematic liq crystal mixt polymer dispersion display | | | | |
| IT | Liquid crystal displays (nematic liq. crystal mixt. esp. suitable for holog. polymer dispersion liq. crystal display) | | | | |
| IT | Liquid crystals (nematic; nematic liq. crystal mixt. esp. suitable for holog. polymer dispersion liq. crystal display) | | | | |
| IT | 38190-45-3 | 40817-08-1 | 52709-86-1 | 54211-46-0 | 63617-61-8 |
| | 99217-32-0 | 99602-91-2 | 104569-87-1 | 104569-88-2 | 116831-09-5 |
| | 132123-39-8 | 137019-94-4 | 137019-95-5 | 219939-28-3 | 219939-29-4 |
| | 281680-31-7 | 313472-50-3 | 316364-68-8 | 356797-91-6 | 356797-92-7 |
| | 356797-93-8 | 356797-97-2 | 356797-99-4 | 356798-03-3 | 356798-05-5 |
| | 356798-06-6 | 356798-12-4 | 356798-23-7 | 356798-25-9 | 356798-26-0 |
| | 356798-27-1 | 356798-31-7 | 356798-32-8 | 385435-70-1 | 388625-24-9 |
| | 388625-25-0 | 388625-26-1 | 388625-28-3 | 388625-29-4 | 388625-31-8 |
| | 388625-33-0 | 388625-42-1 | 388625-45-4 | | |
| | RL: PRP (Properties); TEM (Technical or engineered material use); USES (Uses) (nematic liq. crystal mixt. esp. suitable for holog. polymer dispersion liq. crystal display) | | | | |
| IT | 288-32-4, Imidazole, reactions 463-71-8, Thiophosgene 6160-65-2 67567-26-4, 4-Bromo-2,6-difluoroaniline 143651-26-7, Boronic acid, [4-(4-pentylcyclohexyl)phenyl]-, trans- 388623-07-2 388623-85-6 | | | | |

RL: RCT (Reactant); RACT (Reactant or reagent)
 (prepn. of nematic liq. crystal mixt. esp. suitable for holog. polymer
 dispersion liq. crystal display)

| | | | | | |
|----|--------------|--------------|--------------|--------------|--------------|
| IT | 138074-14-3P | 385435-64-3P | 385435-68-7P | 385435-69-8P | 385435-73-4P |
| | 388623-08-3P | 388623-10-7P | 388623-12-9P | 388623-13-0P | 388623-14-1P |
| | 388623-15-2P | 388623-17-4P | 388623-18-5P | 388623-19-6P | 388623-20-9P |
| | 388623-21-0P | 388623-22-1P | 388623-30-1P | 388623-32-3P | 388623-33-4P |
| | 388623-34-5P | 388623-35-6P | 388623-36-7P | 388623-37-8P | 388623-38-9P |
| | 388623-39-0P | 388623-40-3P | 388623-42-5P | 388623-43-6P | 388623-44-7P |
| | 388623-45-8P | 388623-46-9P | 388623-47-0P | 388623-49-2P | 388623-50-5P |
| | 388623-51-6P | 388623-52-7P | 388623-54-9P | 388623-55-0P | 388623-56-1P |
| | 388623-57-2P | 388623-58-3P | 388623-59-4P | 388623-60-7P | 388623-62-9P |
| | 388623-63-0P | 388623-64-1P | 388623-65-2P | 388623-66-3P | 388623-67-4P |
| | 388623-68-5P | 388623-69-6P | 388623-70-9P | 388623-71-0P | 388623-72-1P |
| | 388623-73-2P | 388623-74-3P | 388623-75-4P | 388623-76-5P | 388623-77-6P |
| | 388623-78-7P | 388623-79-8P | 388623-80-1P | 388623-82-3P | 388623-83-4P |
| | 388623-84-5P | 388623-86-7P | 388623-88-9P | 388623-90-3P | 388623-91-4P |
| | 388623-93-6P | 388623-94-7P | 388623-95-8P | 388623-96-9P | 388623-97-0P |
| | 388623-98-1P | 388623-99-2P | 388624-00-8P | 388624-01-9P | 388624-02-0P |
| | 388624-03-1P | 388624-04-2P | 388624-05-3P | 388624-07-5P | 388624-08-6P |
| | 388624-09-7P | 388624-10-0P | 388624-12-2P | 388624-13-3P | 388624-14-4P |
| | 388624-15-5P | 388624-16-6P | 388624-17-7P | 388624-18-8P | 388624-19-9P |
| | 388624-21-3P | 388624-22-4P | 388624-23-5P | 388624-24-6P | 388624-25-7P |
| | 388624-26-8P | 388624-27-9P | 388624-28-0P | 388624-29-1P | 388624-31-5P |
| | 388624-32-6P | 388624-34-8P | 388624-35-9P | 388624-37-1P | 388624-39-3P |
| | 388624-40-6P | 388624-42-8P | 388624-43-9P | 388624-44-0P | 388624-46-2P |
| | 388624-47-3P | 388624-48-4P | 388624-49-5P | 388624-50-8P | 388624-51-9P |
| | 388624-52-0P | 388624-53-1P | 388624-54-2P | 388624-55-3P | 388624-56-4P |
| | 388624-58-6P | 388624-59-7P | 388624-60-0P | 388624-61-1P | 388624-62-2P |
| | 388624-63-3P | 388624-64-4P | 388624-65-5P | 388624-66-6P | 388624-67-7P |
| | 388624-68-8P | 388624-69-9P | 388624-71-3P | 388624-72-4P | 388624-73-5P |
| | 388624-74-6P | 388624-75-7P | 388624-76-8P | 388624-77-9P | 388624-78-0P |
| | 388624-80-4P | 388624-81-5P | 388624-83-7P | 388624-84-8P | 388624-85-9P |
| | 388624-86-0P | 388624-92-8P | 388624-93-9P | 388624-94-0P | 388624-95-1P |
| | 388624-96-2P | 388624-97-3P | 388624-98-4P | 388624-99-5P | 388625-00-1P |
| | 388625-01-2P | 388625-02-3P | 388625-03-4P | 388625-04-5P | 388625-05-6P |
| | 388625-06-7P | 388625-07-8P | 388625-08-9P | 388625-09-0P | 388625-10-3P |
| | 388625-11-4P | 388625-12-5P | 388625-13-6P | 388625-14-7P | 388625-15-8P |
| | 388625-16-9P | 388625-17-0P | 388625-18-1P | 388625-19-2P | 388625-20-5P |
| | 388625-21-6P | 388625-22-7P | 388625-23-8P | | |

RL: SPN (Synthetic preparation); TEM (Technical or engineered material
 use); PREP (Preparation); USES (Uses)
 (prepn. of nematic liq. crystal mixt. esp. suitable for holog. polymer
 dispersion liq. crystal display)

REFERENCE 2

AN 136:77327 CA
 TI Liquid-crystal medium, liquid-crystal display using it, and utilization of
 it
 IN Manabe, Atsutaka; Poetsch, Eike; Reiffenrath, Volker
 PA Merck Patent G.M.B.H., Germany
 SO Jpn. Kokai Tokkyo Koho, 27 pp.
 CODEN: JKXXAF
 DT Patent
 LA Japanese
 IC ICM C09K019-02
 ICS C09K019-12; C09K019-16; C09K019-18; C09K019-30; C09K019-34;
 C09K019-42; G02F001-13; G02F001-1334
 CC 74-13 (Radiation Chemistry, Photochemistry, and Photographic and Other
 Reprographic Processes)

FAN.CNT 1

| | | | | |
|------------|------|-------|-----------------|-------|
| PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
| ----- | ---- | ----- | ----- | ----- |

PI JP 2002003844 A2 20020109 JP 2001-137708 20010508

PRAI EP 2000-109162 20000508

AB The medium contains (1) a strongly pos. dielec. liq.-crystal component A comprising .gtoreq.1 compds. having NCS groups at a terminal and having .DELTA.n >0.30 at 20.degree. and 589.3 nm and (2) a pos. dielec. liq.-crystal component B contg. compds. with broad nematic phase range. Also claimed are liq.-crystal displays and systems including the medium. The medium is esp. suitable for polymer dispersed liq.-crystal systems (PDLC) and holog. PDLC.

ST liq crystal display pos dielec component broad nematic phase

IT Liquid crystal displays

(liq.-crystal medium with strongly pos. dielec. and broad nematic phase range for display)

IT 40817-08-1D, mixt. contg. 52709-86-1D, mixt. contg. 58743-75-2D, mixt. contg. 58743-76-3D, mixt. contg. 99217-32-0D, mixt. contg. 116831-09-5D, mixt. contg. 138074-14-3D, mixt. contg. 313472-50-3D, mixt. contg. 316364-68-8D, mixt. contg. 356797-91-6D, mixt. contg. 356797-92-7D, mixt. contg. 356797-93-8D, mixt. contg. 356797-99-4D, mixt. contg. 356798-03-3D, mixt. contg. 356798-05-5D, mixt. contg. 356798-06-6D, mixt. contg. 356798-23-7D, mixt. contg. 356798-27-1D, mixt. contg. 385435-48-3 385435-64-3D, mixt. contg. 385435-68-7D, mixt. contg. 385435-69-8D, mixt. contg. 385435-70-1D, mixt. contg. 385435-71-2 385435-72-3 385435-73-4D, mixt. contg.

RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)

(liq.-crystal medium with strongly pos. dielec. and broad nematic phase range for display)

REFERENCE 3

AN 135:203078 CA

TI Liquid crystal medium comprising strongly dielectric positive isothiocyanate compound for polymer dispersed liquid crystal display

IN Poetsch, Eike; Manabe, Atsutaka; Reiffenrath, Volker; Reuter, Markus; Krause, Joachim; Pauluth, Detlef

PA Merck Patent Gmbh, Germany

SO Eur. Pat. Appl., 54 pp.

CODEN: EPXXDW

DT Patent

LA English

IC ICM C09K019-02

ICS C09K019-16; C09K019-12; C09K019-42; C09K019-44; C09K019-54; C07C331-28

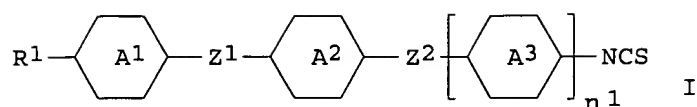
CC 74-13 (Radiation Chemistry, Photochemistry, and Photographic and Other Reprographic Processes)

Section cross-reference(s): 75

FAN.CNT 1

| | PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|------|---|---------------|----------------------|-----------------|----------|
| PI | EP 1126006 | A2 | 20010822 | EP 2001-101157 | 20010123 |
| | EP 1126006 | A3 | 20030226 | | |
| | R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO | | | | |
| | US 2002142108 | A1 | 20021003 | US 2001-773673 | 20010202 |
| | JP 2001254080 | A2 | 200110918 | JP 2001-37730 | 20010214 |
| PRAI | EP 2000-102952 | 20000214 | | | |
| | EP 2000-109164 | 20000508 | | | |
| | EP 2000-126408 | 20001205 | | | |
| | EP 2000-EP00109164 | 20000508 | | | |
| | EP 2000-EP00126408 | 20001205 | | | |

GI



AB The invention relates to liq. crystal media comprising a strongly dielec. pos. isothiocyanate compds. of formula I (R1=alkyl, C1-10-alkoxy, alkenyl, C1-7-alkenyloxy or-alkoxyalkyl, CN, NCS, halogen; Z1, Z2 = single bond, trans-CH=CH, Z2 = single bond if n1 = 0; n1 = 0,1; A1, A2, A3 = phenyls, at least one of phenyls is substituted by one or two fluorine atoms) , and another dielec. pos. compd., preferably comprising terminally polar substituted bi- or terphenyl compds., as further defined in the claims, as well as to liq. crystal displays comprising these media, in particular to polymer dispersed liq. crystal display (PDLC) and most particular to holog. PDLC displays.

ST liq crystal isothiocyanate compd medium prepn polymer dispersed display
IT Liquid crystal displays
Liquid crystals

(liq. crystal medium comprising strongly dielec. pos. isothiocyanate compds for polymer dispersed liq. crystal display)

IT 92-52-4, Biphenyl, reactions 367-24-8, 4-Bromo-2-fluoroaniline 461-96-1, 1-Bromo-3,5-difluoro-benzene 588-96-5, p-Ethoxyphenylbromide 5459-40-5, 4-Ethoxy-styrene 6160-65-2 6163-58-2, Tri-o-tolylphosphine 10101-89-0, Trisodiumphosphate dodecahydrate 13965-03-2 23055-77-8, 4-Bromo-4'-chloro-biphenyl 31989-57-8, Bis(triphenylphosphine) palladium 67567-26-4, 4-Bromo-2,6-difluoroaniline 105931-73-5, 1-Bromo-3-fluoro-4-iodo-benzene

RL: RCT (Reactant); RACT (Reactant or reagent)
(in prepn. of isothiocyanate liq. crystal compds)

IT 71274-84-5P, 4-Trifluoromethoxy-biphenyl
RL: RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation); RACT (Reactant or reagent)

(in prepn. of isothiocyanate liq. crystal compds)

IT 160347-36-4P 356797-91-6P 356797-92-7P 356797-93-8P 356797-94-9P
356797-95-0P 356797-96-1P 356797-97-2P 356797-98-3P 356797-99-4P
356798-00-0P 356798-01-1P 356798-02-2P 356798-03-3P 356798-04-4P
356798-05-5P 356798-06-6P 356798-07-7P 356798-08-8P 356798-09-9P
356798-10-2P 356798-11-3P 356798-12-4P 356798-13-5P 356798-14-6P
356798-15-7P 356798-16-8P 356798-17-9P 356798-18-0P 356798-19-1P
356798-20-4P 356798-21-5P 356798-22-6P

RL: PRP (Properties); SPN (Synthetic preparation); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)

(liq. crystal medium comprising strongly dielec. pos. isothiocyanate compds for polymer dispersed liq. crystal display)

IT 63617-61-8 116831-09-5 127523-43-7 219939-28-3 219939-29-4
313472-50-3 356798-23-7 356798-24-8 356798-25-9 356798-26-0
356798-27-1 356798-28-2 356798-29-3 356798-30-6 356798-31-7
356798-32-8

RL: TEM (Technical or engineered material use); USES (Uses)

(liq. crystal medium comprising strongly dielec. pos. isothiocyanate compds for polymer dispersed liq. crystal display)

REFERENCE 4

AN 134:63754 CA
TI Materials for liquid crystal displays with reduced power consumption
AU Kirsch, Peer; Bremer, Matthias; Kirsch, Annette; Manabe, Atsutaka; Poetsch, Eike; Reiffenrath, Volker; Tarumi, Kazuaki
CS Liquid Crystals Division, Merck KGaA, Darmstadt, 64271, Germany
SO Molecular Crystals and Liquid Crystals Science and Technology, Section A: Molecular Crystals and Liquid Crystals (2000), 346, 193-199
CODEN: MCLCE9; ISSN: 1058-725X

PB Gordon & Breach Science Publishers
 DT Journal
 LA English
 CC 74-13 (Radiation Chemistry, Photochemistry, and Photographic and Other Reprographic Processes)
 Section cross-reference(s): 75

AB A significant redn. of the power consumption of a liq. crystal display can be achieved either by application of a lower driving voltage or - even more effectively - by use of a holog. structured reflective scattering type of display without color filters. The first option requires strongly polar materials with extremely high reliability, the second one new types of liq. crystals with a birefringence as high as possible in order to optimize the scattering effect. A mol. modeling based method for the prediction of reliability parameters is presented.

ST liq crystal display active matrix high birefringence reliability material; mol model stable materials liq crystal display active matrix

IT Liquid crystal displays
 (active matrix; materials with high birefringence or improved voltage holding ratio for active matrix liq. crystal displays with reduced power consumption)

IT Ion-molecule reaction
 (enthalpy, calcd. semiempirical; materials with high birefringence or improved voltage holding ratio for active matrix liq. crystal displays with reduced power consumption in relation to)

IT Liquid crystals
 (fluorinated; materials with high birefringence or improved voltage holding ratio for active matrix liq. crystal displays with reduced power consumption in relation to)

IT Reaction enthalpy
 (ion-mol. reaction, calcd. semiempirical; materials with high birefringence or improved voltage holding ratio for active matrix liq. crystal displays with reduced power consumption in relation to)

IT Impurities
 (ionic; materials with high birefringence or improved voltage holding ratio for active matrix liq. crystal displays with reduced power consumption in relation to)

IT Birefringence
 Dielectric anisotropy
 (materials with high birefringence or improved voltage holding ratio for active matrix liq. crystal displays with reduced power consumption)

IT Molecular modeling
 (materials with high birefringence or improved voltage holding ratio for active matrix liq. crystal displays with reduced power consumption supported by)

IT Molecular structure-property relationship
 (stability; materials with high birefringence or improved voltage holding ratio for active matrix liq. crystal displays with reduced power consumption in relation to materials stability)

IT 126391-77-3 133261-31-1 221526-80-3 255728-73-5 255728-82-6
 308117-08-0 313472-49-0 313472-50-3
 RL: PRP (Properties)
 (materials with high birefringence or improved voltage holding ratio for active matrix liq. crystal displays with reduced power consumption)

IT 17341-25-2, processes
 RL: PEP (Physical, engineering or chemical process); PROC (Process)
 (materials with high birefringence or improved voltage holding ratio for active matrix liq. crystal displays with reduced power consumption in relation to ionic impurities)

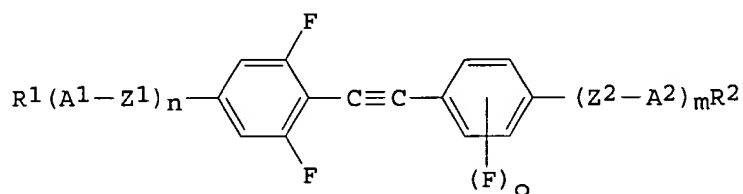
RE.CNT 6 THERE ARE 6 CITED REFERENCES AVAILABLE FOR THIS RECORD
 (1) Bremer, M; Adv Mater 1993, V5, P842 CAPLUS
 (2) Bremer, M; Jpn J Appl Phys 1998, V37, PL88 CAPLUS
 (3) Kirsch, P; Angew Chem 1999, V111, P2174
 (4) Kirsch, P; Angew Chem Int Ed Engl 1999, V38, P1989 CAPLUS
 (5) Klasen, M; Jpn J Appl Phys 1998, V37, PL945 CAPLUS

(6) Sasaki, A; Japan Display '86 1986, P62

AN 1993:59406 CAPLUS
 DN 118:59406
 TI 2,6 difluorotolane
 IN Reiffenrath, Volker; Plach, Herbert
 PA Merck Patent G.m.b.H., Germany
 SO Ger. Offen., 19 pp.
 CODEN: GWXXBX
 DT Patent
 LA German
 IC ICM C07C043-225
 ICS C07C025-24; C09K019-06; G09F009-35; G02F001-13; C07D319-06;
 C07D213-24; C07D239-24
 ICA C09K019-18; C09K019-30; C09K019-34; C09K019-20; C09K019-58; C07D521-00;
 C07D401-10; C07D401-12; C07D405-10; C07D405-12
 CC 25-3 (Benzene, Its Derivatives, and Condensed Benzenoid Compounds)
 FAN.CNT 1

| PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|----------------------|------|----------|-----------------|----------|
| DE 4105742 | A1 | 19920827 | DE 1991-4105742 | 19910223 |
| DE 4105742 | C2 | 20010809 | | |
| PRAI DE 1991-4105742 | | 19910223 | | |

OS CASREACT 118:59406; MARPAT 118:59406
 GI



AB A process was developed for the prepn. of 2,6-difluorotolane of formula I [R1, R2 = alkyl or alkenyl, A1, A2 = 1,4-cyclohexylene, -phenylene, 2- or 3-fluoro-1,4-phenylene, Z1, Z2 = CH2CH2, -CH2O-, (CH2)4, m, n, o = 1-2] as a component of liq. crystal medium having electrooptical properties. E.g., the treatment of 3,5-difluoropentylbenzene (0.129 mol) with 114 mL THF and BuLi followed by 4-ethoxyacetophenone (0.129 mol) gave a product mixt. which was treated with p-toluenesulfonic acid (4 g) in toluene. Subsequent reaction of product mixt. with .09 mL bromine in EtOAc and with 12.6 mL Et3N and then reaction with LDA in THF gave final product 4-pentyl-2,6-difluoro-4'-ethoxytolane.

ST fluorotolane electrooptical property; acetylene difluoro diphenyl;
 palladium catalyst coupling fluorophenylacetylene iodobenzene

IT Coupling reaction
 (of difluorophenylacetylene with trifluoromethoxyiodobenzene and analogs, difluorotolanes from)

IT Coupling reaction catalysts
 (palladium compds., for the coupling of difluorophenylacetylene with trifluoromethoxyiodobenzene and analogs, difluorotolanes from)

IT 144890-97-1
 RL: RCT (Reactant); RACT (Reactant or reagent)
 (3)

IT 14221-01-3
 RL: CAT (Catalyst use); USES (Uses)
 (catalyst, for the coupling of difluoroiodobenzene derivs. with fluorophenylacetylene)

IT 13965-03-2
 RL: CAT (Catalyst use); USES (Uses)
 (catalyst, for the coupling of difluorophenylacetylene deriv. with trifluoromethoxyiodobenzene)

IT 628-17-1
RL: RCT (Reactant); RACT (Reactant or reagent)
(condensation reaction of, with difluorobromobenzene)

IT 461-96-1
RL: RCT (Reactant); RACT (Reactant or reagent)
(condensation reaction of, with iodopentane)

IT 103962-05-6
RL: RCT (Reactant); RACT (Reactant or reagent)
(coupling reaction of, with difluorophenylacetylene deriv.)

IT 766-98-3
RL: RCT (Reactant); RACT (Reactant or reagent)
(coupling reaction of, with ethoxydifluoriodobenzene)

IT 144911-50-2
RL: RCT (Reactant); RACT (Reactant or reagent)
(coupling reaction of, with trifluoromethoxyiodobenzene)

IT 144891-25-8
RL: RCT (Reactant); RACT (Reactant or reagent)
(iodination of)

IT 144891-24-7P
RL: RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation); RACT
(Reactant or reagent)
(prepn. and coupling of, with fluorophenylacetylene)

IT 40817-08-1P 41122-70-7P 52709-83-8P 58743-75-2P 58743-76-3P
61203-99-4P 61204-01-1P 79832-84-1P 80944-44-1P 80955-71-1P
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144890-99-3P 144891-00-9P 144891-01-0P 144891-02-1P 144891-03-2P
144891-04-3P 144891-05-4P 144891-06-5P 144891-07-6P 144891-08-7P
144891-09-8P 144891-10-1P 144891-11-2P 144891-12-3P 144891-13-4P
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144891-31-6P 144891-32-7P **144891-33-8P 144891-34-9P**
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144911-58-0P 144911-59-1P 144911-60-4P

144911-61-5P 144911-62-6P 144911-63-7P

144911-64-8P 144911-65-9P 144911-66-0P

RL: SPN (Synthetic preparation); PREP (Preparation)
 (prepn. of)

IT 144911-67-1P 144911-68-2P 144911-69-3P 144911-70-6P 144911-71-7P
 144911-72-8P 144911-73-9P 144911-74-0P 144922-37-2P 144922-38-3P
 144922-39-4P

RL: SPN (Synthetic preparation); PREP (Preparation)
 (prepn. of)

IT 1676-63-7

RL: RCT (Reactant); RACT (Reactant or reagent)
 (reaction of, with difluoro(pentyl)benzene)

IT 121219-25-8

RL: RCT (Reactant); RACT (Reactant or reagent)
 (reaction of, with ethoxyacetophenone)

IT **144891-33-8P 144891-34-9P 144891-35-0P**

144891-36-1P 144891-37-2P 144891-38-3P

144891-39-4P 144911-57-9P 144911-58-0P

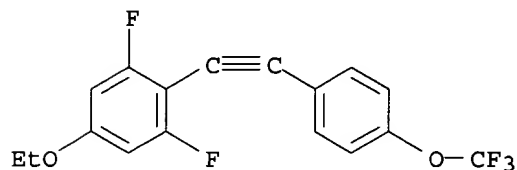
144911-59-1P 144911-60-4P 144911-61-5P

144911-62-6P 144911-63-7P

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 (prepn. of)

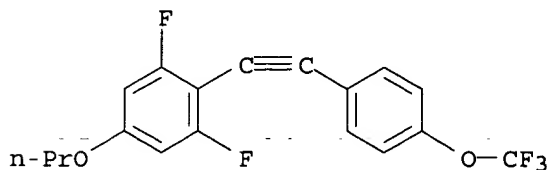
RN 144891-33-8 CAPLUS

CN Benzene, 5-ethoxy-1,3-difluoro-2-[[4-(trifluoromethoxy)phenyl]ethynyl]-
 (9CI) (CA INDEX NAME)



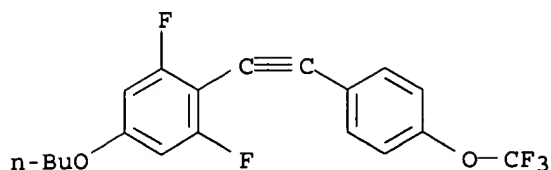
RN 144891-34-9 CAPLUS

CN Benzene, 1,3-difluoro-5-propoxy-2-[[4-(trifluoromethoxy)phenyl]ethynyl]-
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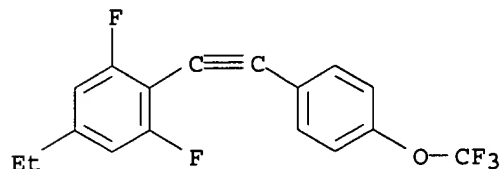


RN 144891-35-0 CAPLUS

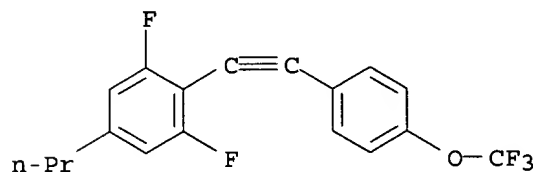
CN Benzene, 5-butoxy-1,3-difluoro-2-[[4-(trifluoromethoxy)phenyl]ethynyl]-
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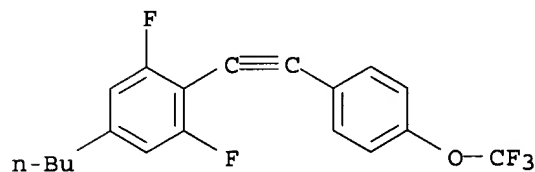
RN 144891-36-1 CAPLUS
 CN Benzene, 5-ethyl-1,3-difluoro-2-[[4-(trifluoromethoxy)phenyl]ethynyl] -
 (9CI) (CA INDEX NAME)



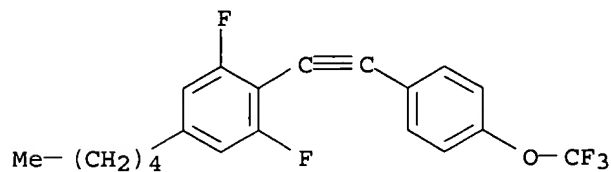
RN 144891-37-2 CAPLUS
 CN Benzene, 1,3-difluoro-5-propyl-2-[[4-(trifluoromethoxy)phenyl]ethynyl] -
 (9CI) (CA INDEX NAME)



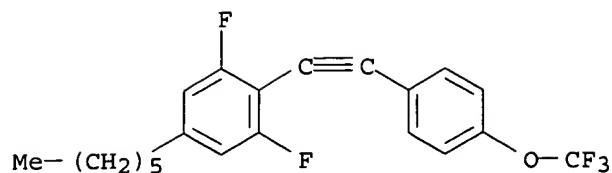
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 CN Benzene, 5-butyl-1,3-difluoro-2-[[4-(trifluoromethoxy)phenyl]ethynyl] -
 (9CI) (CA INDEX NAME)



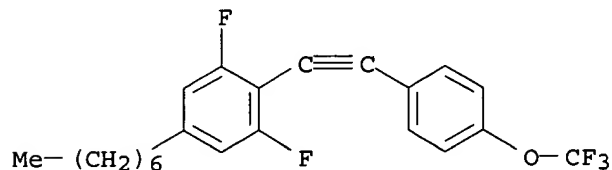
RN 144891-39-4 CAPLUS
 CN Benzene, 1,3-difluoro-5-pentyl-2-[[4-(trifluoromethoxy)phenyl]ethynyl] -
 (9CI) (CA INDEX NAME)



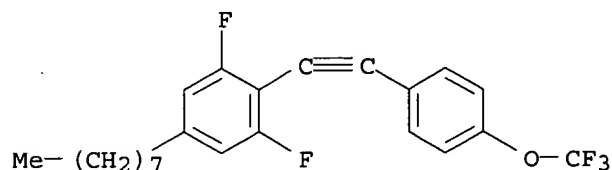
RN 144911-57-9 CAPLUS
 CN Benzene, 1,3-difluoro-5-hexyl-2-[[4-(trifluoromethoxy)phenyl]ethynyl] -
 (9CI) (CA INDEX NAME)



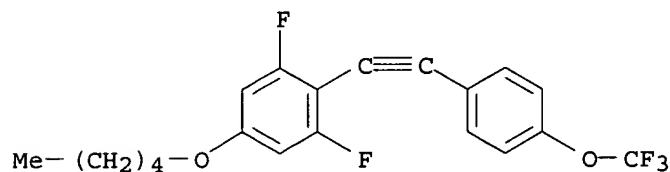
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 (9CI) (CA INDEX NAME)



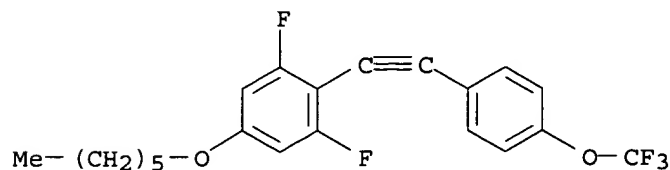
RN 144911-59-1 CAPLUS
 CN Benzene, 1,3-difluoro-5-octyl-2-[[4-(trifluoromethoxy)phenyl]ethynyl]-
 (9CI) (CA INDEX NAME)



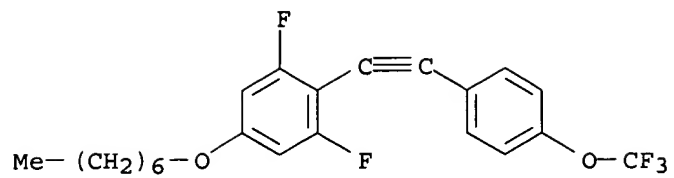
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 (9CI) (CA INDEX NAME)



RN 144911-61-5 CAPLUS
 CN Benzene, 1,3-difluoro-5-(hexyloxy)-2-[[4-(trifluoromethoxy)phenyl]ethynyl]-
 (9CI) (CA INDEX NAME)

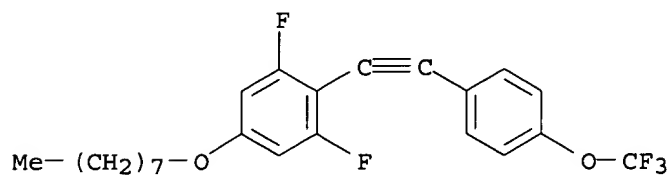


RN 144911-62-6 CAPLUS
 CN Benzene, 1,3-difluoro-5-(heptyloxy)-2-[[4-(trifluoromethoxy)phenyl]ethynyl]-
 (9CI) (CA INDEX NAME)

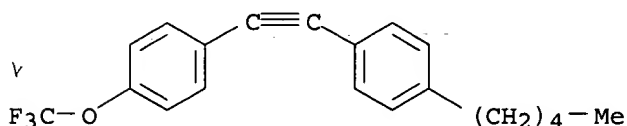


RN 144911-63-7 CAPLUS

CN Benzene, 1,3-difluoro-5-(octyloxy)-2-[[4-(trifluoromethoxy)phenyl]ethynyl]-
(9CI) (CA INDEX NAME)



AN 1990:641336 CAPLUS
 DN 113:241336
 TI Synthesis and properties of liquid crystalline materials with high optical anisotropy
 AU Reiffenrath, V.; Finkenzeller, U.; Poetsch, E.; Rieger, B.; Coates, D.
 CS Ind. Chem. Div., E. Merck, Darmstadt, D-6100, Germany
 SO Proceedings of SPIE-The International Society for Optical Engineering (1990), 1257(Liq. Cryst. Disp. Appl.), 84-94
 CODEN: PSISDG; ISSN: 0277-786X
 DT Journal
 LA English
 CC 74-13 (Radiation Chemistry, Photochemistry, and Photographic and Other Reprographic Processes)
 Section cross-reference(s): 21, 75
 AB The introduction of F and F-contg. substituents in the terminal position of high .DELTA.n (refractive index difference) materials leads to liq. crystals with high pos. dielec. anisotropy and low viscosity. These liq. crystals exhibit high resistivity and excellent UV-stability. In contrast to the cyano-substituent these moieties do not enhance the optical anisotropy; therefore the use of basic structures having high optical anisotropy such as tolans and terphenyls is necessary. In the case of terphenyls the introduction of an ethylenic bridge in addn. to lateral fluorination leads to mols. having a wide nematic phase range.
 ST synthesis liq crystal optical anisotropy; electrooptical device liq crystal dielec anisotropy
 IT Liquid crystals
 (prepn. of fluorine-contg., with high optical anisotropy and UV stability and low viscosity)
 IT Optical imaging devices
 (electro-, liq.-crystal, prepn. of fluorine-contg. liq. crystal materials having high optical anisotropy and UV stability and low viscosity for)
 IT 95759-62-9P 116903-47-0P 121218-93-7P 130746-59-7P
 130746-60-0P 130746-61-1P 130746-62-2P
 130746-63-3P 130746-64-4P 130746-65-5P 130746-66-6P
 130746-67-7P 130746-68-8P 130746-69-9P 130746-70-2P 130746-71-3P
 130746-72-4P 130746-73-5P 130746-74-6P 130746-75-7P 130746-76-8P
 130746-77-9P 130746-78-0P 130746-79-1P 130746-80-4P 130746-81-5P
 RL: PREP (Preparation)
 (prepn. and dielec. anisotropy and UV stability and viscosity of, for display devices)
 IT 130746-60-0P 130746-62-2P 130746-63-3P
 RL: PREP (Preparation)
 (prepn. and dielec. anisotropy and UV stability and viscosity of, for display devices)
 RN 130746-60-0 CAPLUS
 CN Benzene, 1-[(4-pentylphenyl)ethynyl]-4-(trifluoromethoxy)- (9CI) (CA INDEX NAME)



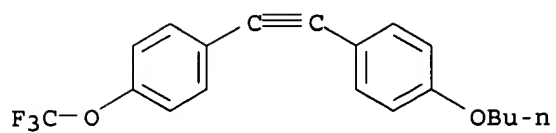
RN 130746-62-2 CAPLUS
 CN Benzene, 1-[(4-butoxyphenyl)ethynyl]-4-(trifluoromethoxy)- (9CI) (CA INDEX NAME)

X

not

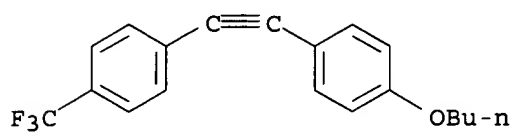
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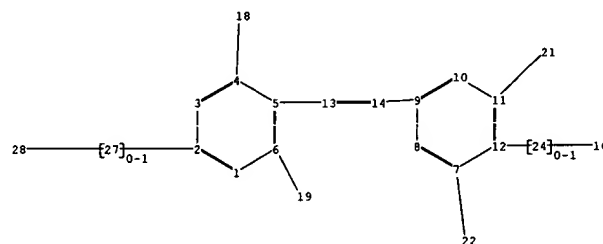
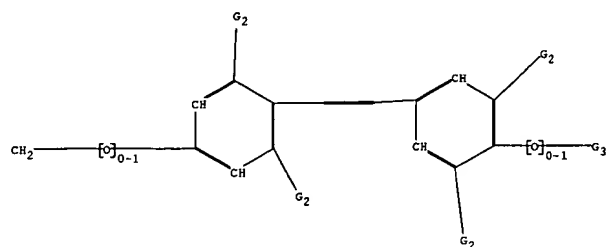
at my



RN 130746-63-3 CAPLUS

CN Benzene, 1-[(4-butoxyphenyl)ethynyl]-4-(trifluoromethyl)-(9CI) (CA INDEX NAME)





chain nodes :

13 14 16 18 19 21 22 24 27 28

ring nodes :

1 2 3 4 5 6 7 8 9 10 11 12

chain bonds :

2-27 4-18 5-13 6-19 7-22 9-14 11-21 12-24 13-14 16-24 27-28

ring bonds :

1-2 1-6 2-3 3-4 4-5 5-6 7-8 7-12 8-9 9-10 10-11 11-12

exact/norm bonds :

2-27 4-18 6-19 7-22 11-21 12-24 16-24

exact bonds :

5-13 9-14 13-14 27-28

normalized bonds :

1-2 1-6 2-3 3-4 4-5 5-6 7-8 7-12 8-9 9-10 10-11 11-12

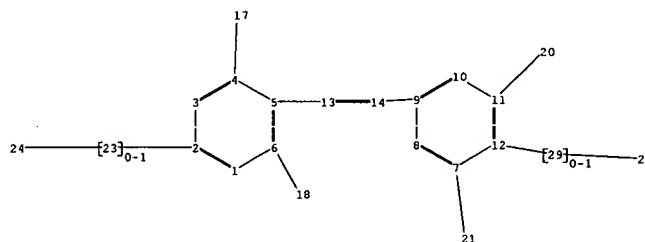
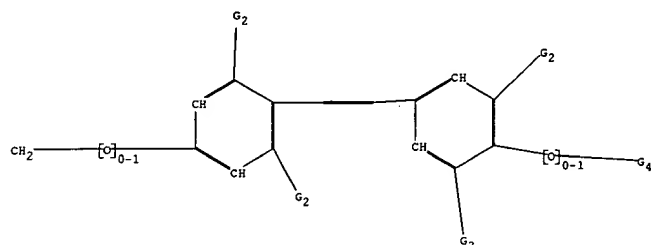
G1:C,O

G2:H,F

G3:CF3,N

Match level :

1:Atom 2:Atom 3:Atom 4:Atom 5:Atom 6:Atom 7:Atom 8:Atom 9:Atom 10:Atom 11:Atom
12:Atom 13:CLASS 14:CLASS 16:CLASS 18:CLASS 19:CLASS 21:CLASS 22:CLASS 24:CLASS
27:CLASS 28:CLASS



chain nodes :

13 14 17 18 20 21 23 24 28 29

ring nodes :

1 2 3 4 5 6 7 8 9 10 11 12

chain bonds :

2-23 4-17 5-13 6-18 7-21 9-14 11-20 12-29 13-14 23-24 28-29

ring bonds :

1-2 1-6 2-3 3-4 4-5 5-6 7-8 7-12 8-9 9-10 10-11 11-12

exact/norm bonds :

2-23 4-17 6-18 7-21 11-20 12-29 28-29

exact bonds :

5-13 9-14 13-14 23-24

normalized bonds :

1-2 1-6 2-3 3-4 4-5 5-6 7-8 7-12 8-9 9-10 10-11 11-12

G1:C,O

G2:H,F

G3:CN,CF3,N

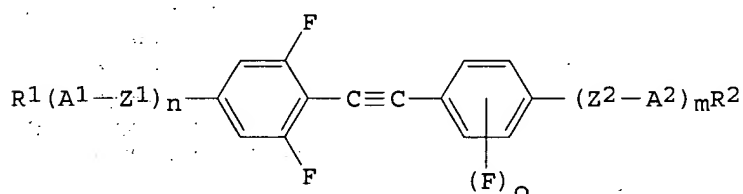
G4:CF3,N

Match level :

1:Atom 2:Atom 3:Atom 4:Atom 5:Atom 6:Atom 7:Atom 8:Atom 9:Atom 10:Atom 11:Atom
12:Atom 13:CLASS 14:CLASS 17:CLASS 18:CLASS 20:CLASS 21:CLASS 23:CLASS 24:CLASS
28:CLASS 29:CLASS

AN 1993:59406 CAPLUS
 DN 118:59406
 TI 2,6 difluorotolane
 IN Reiffenrath, Volker; Plach, Herbert
 PA Merck Patent G.m.b.H., Germany
 SO Ger. Offen., 19 pp.
 CODEN: GWXXBX
 DT Patent
 LA German
 IC ICM C07C043-225
 ICS C07C025-24; C09K019-06; G09F009-35; G02F001-13; C07D319-06;
 C07D213-24; C07D239-24
 ICA C09K019-18; C09K019-30; C09K019-34; C09K019-20; C09K019-58; C07D521-00;
 C07D401-10; C07D401-12; C07D405-10; C07D405-12
 CC 25-3 (Benzene, Its Derivatives, and Condensed Benzenoid Compounds)
 FAN.CNT 1

| | PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|------|--------------------------------------|------|----------|-----------------|----------|
| PI | DE 4105742 | A1 | 19920827 | DE 1991-4105742 | 19910223 |
| | DE 4105742 | C2 | 20010809 | | |
| PRAI | DE 1991-4105742 | | 19910223 | | |
| OS | CASREACT 118:59406; MARPAT 118:59406 | | | | |
| GI | | | | | |



AB A process was developed for the prepn. of 2,6-difluorotolane of formula I [R1, R2 = alkyl or alkenyl, A1, A2 = 1,4-cyclohexylene, -phenylene, 2- or 3-fluoro-1,4-phenylene, Z1, Z2 = CH2CH2, -CH2O-, (CH2)4, m, n, o = 1-2] as a component of liq. crystal medium having electrooptical properties. E.g., the treatment of 3,5-difluoropentylbenzene (0.129 mol) with 114 mL THF and BuLi followed by 4-ethoxyacetophenone (0.129 mol) gave a product mixt. which was treated with p-toluenesulfonic acid (4 g) in toluene. Subsequent reaction of product mixt. with .09 mL bromine in EtOAc and with 12.6 mL Et3N and then reaction with LDA in THF gave final product 4-pentyl-2,6-difluoro-4'-ethoxytolane.

ST fluorotolane electrooptical property; acetylene difluoro diphenyl; palladium catalyst coupling fluorophenylacetylene iodobenzene

IT Coupling reaction
 (of difluorophenylacetylene with trifluoromethoxyiodobenzene and analogs, difluorotolanes from)

IT Coupling reaction catalysts
 (palladium compds., for the coupling of difluorophenylacetylene with trifluoromethoxyiodobenzene and analogs, difluorotolanes from)

IT 144890-97-1
 RL: RCT (Reactant); RACT (Reactant or reagent)
 (3)

IT 14221-01-3
 RL: CAT (Catalyst use); USES (Uses)
 (catalyst, for the coupling of difluoriodobenzene derivs. with fluorophenylacetylene)

IT 13965-03-2
 RL: CAT (Catalyst use); USES (Uses)
 (catalyst, for the coupling of difluorophenylacetylene deriv. with trifluoromethoxyiodobenzene)

IT 628-17-1
RL: RCT (Reactant); RACT (Reactant or reagent)
(condensation reaction of, with difluorobromobenzene)

IT 461-96-1
RL: RCT (Reactant); RACT (Reactant or reagent)
(condensation reaction of, with iodopentane)

IT 103962-05-6
RL: RCT (Reactant); RACT (Reactant or reagent)
(coupling reaction of, with difluorophenylacetylene deriv.)

IT 766-98-3
RL: RCT (Reactant); RACT (Reactant or reagent)
(coupling reaction of, with ethoxydifluoriodobenzene)

IT 144911-50-2
RL: RCT (Reactant); RACT (Reactant or reagent)
(coupling reaction of, with trifluoromethoxyiodobenzene)

IT 144891-25-8
RL: RCT (Reactant); RACT (Reactant or reagent)
(iodination of)

IT 144891-24-7P
RL: RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation); RACT
(Reactant or reagent)
(prepn. and coupling of, with fluorophenylacetylene)

IT 40817-08-1P 41122-70-7P 52709-83-8P 58743-75-2P 58743-76-3P
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144890-99-3P 144891-00-9P 144891-01-0P 144891-02-1P 144891-03-2P
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144911-58-0P 144911-59-1P 144911-60-4P

144911-61-5P 144911-62-6P 144911-63-7P

144911-64-8P 144911-65-9P 144911-66-0P

RL: SPN (Synthetic preparation); PREP (Preparation)

(prepn. of)

IT 144911-67-1P 144911-68-2P 144911-69-3P 144911-70-6P 144911-71-7P
 144911-72-8P 144911-73-9P 144911-74-0P 144922-37-2P 144922-38-3P
 144922-39-4P

RL: SPN (Synthetic preparation); PREP (Preparation)

(prepn. of)

IT 1676-63-7

RL: RCT (Reactant); RACT (Reactant or reagent)

(reaction of, with difluoro(pentyl)benzene)

IT 121219-25-8

RL: RCT (Reactant); RACT (Reactant or reagent)

(reaction of, with ethoxyacetophenone)

IT 144891-33-8P 144891-34-9P 144891-35-0P

144891-36-1P 144891-37-2P 144891-38-3P

144891-39-4P 144911-57-9P 144911-58-0P

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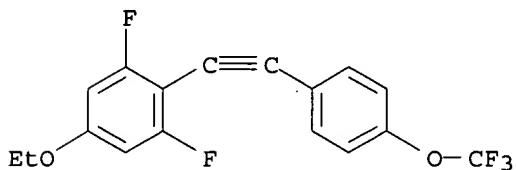
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(prepn. of)

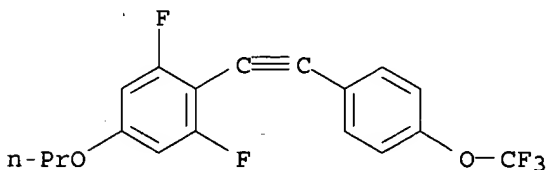
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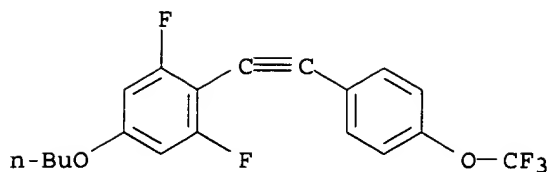
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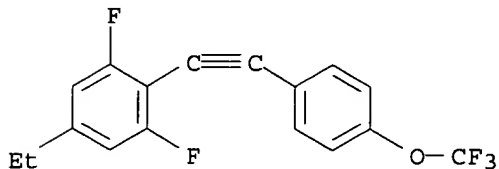


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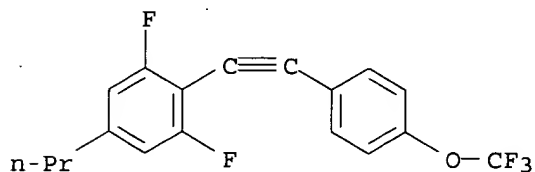
CN Benzene, 5-butoxy-1,3-difluoro-2-[[4-(trifluoromethoxy)phenyl]ethynyl]-
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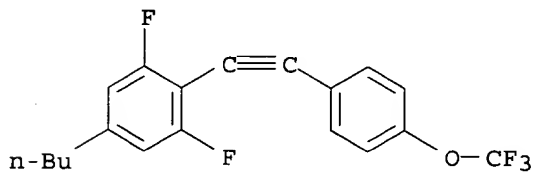
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 CN Benzene, 5-ethyl-1,3-difluoro-2-[[4-(trifluoromethoxy)phenyl]ethynyl] -
 (9CI) (CA INDEX NAME)



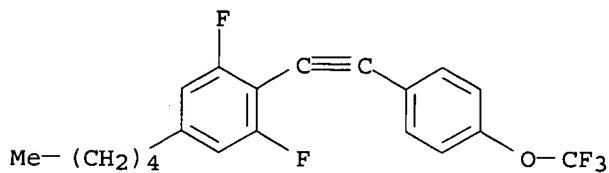
RN 144891-37-2 CAPLUS
 CN Benzene, 1,3-difluoro-5-propyl-2-[[4-(trifluoromethoxy)phenyl]ethynyl] -
 (9CI) (CA INDEX NAME)



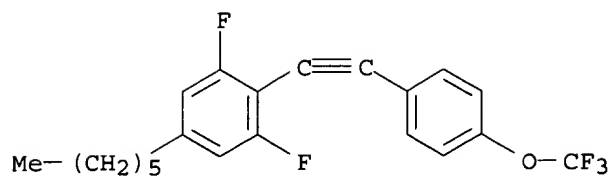
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 (9CI) (CA INDEX NAME)



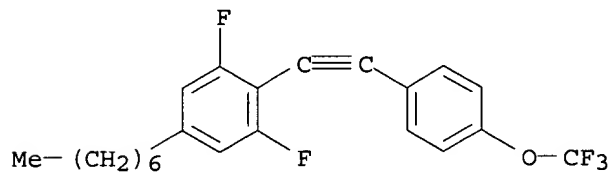
RN 144891-39-4 CAPLUS
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 (9CI) (CA INDEX NAME)



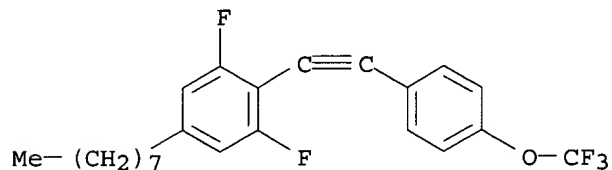
RN 144911-57-9 CAPLUS
 CN Benzene, 1,3-difluoro-5-hexyl-2-[[4-(trifluoromethoxy)phenyl]ethynyl] -
 (9CI) (CA INDEX NAME)



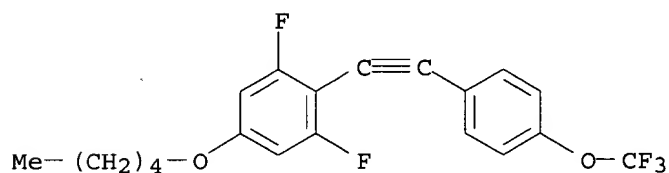
RN 144911-58-0 CAPLUS
 CN Benzene, 1,3-difluoro-5-heptyl-2-[[4-(trifluoromethoxy)phenyl]ethynyl]-
 (9CI) (CA INDEX NAME)



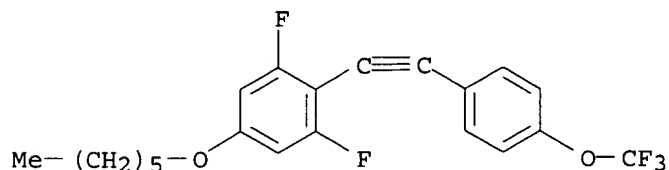
RN 144911-59-1 CAPLUS
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 (9CI) (CA INDEX NAME)



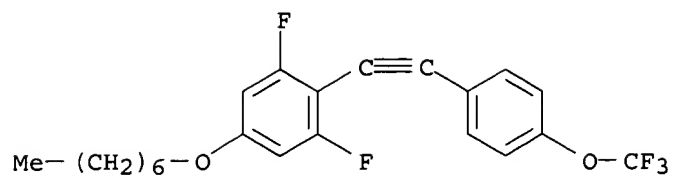
RN 144911-60-4 CAPLUS
 CN Benzene, 1,3-difluoro-5-(pentyloxy)-2-[[4-(trifluoromethoxy)phenyl]ethynyl]-
 (9CI) (CA INDEX NAME)



RN 144911-61-5 CAPLUS
 CN Benzene, 1,3-difluoro-5-(hexyloxy)-2-[[4-(trifluoromethoxy)phenyl]ethynyl]-
 (9CI) (CA INDEX NAME)



RN 144911-62-6 CAPLUS
 CN Benzene, 1,3-difluoro-5-(heptyloxy)-2-[[4-(trifluoromethoxy)phenyl]ethynyl]-
 (9CI) (CA INDEX NAME)



RN 144911-63-7 CAPLUS

CN Benzene, 1,3-difluoro-5-(octyloxy)-2-[[4-(trifluoromethoxy)phenyl]ethynyl]-
(9CI) (CA INDEX NAME)

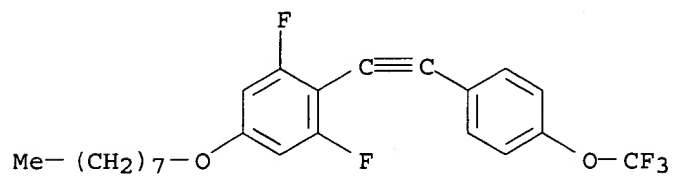
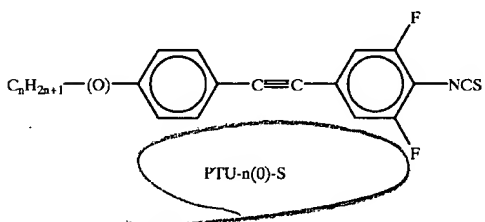
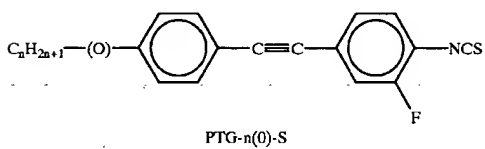
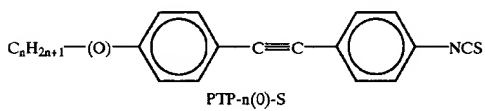
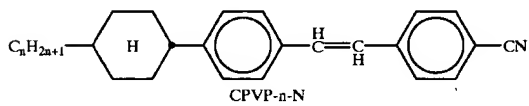
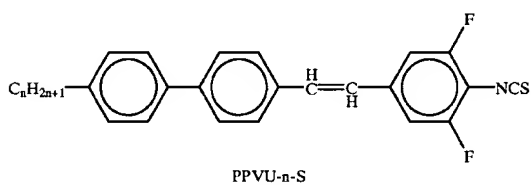
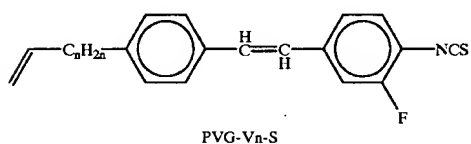
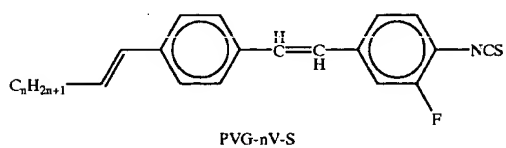
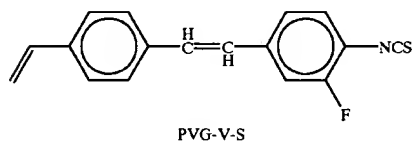
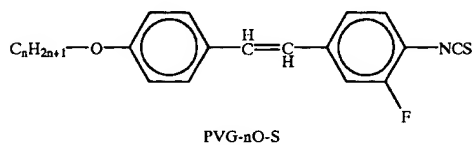


TABLE B-continued



Use-example 7

[0216] A liquid crystal mixture is realized consisting of:

| Compound/Abbreviation | Concentration/mass-% |
|-----------------------|----------------------|
| PTG-5-S | 10.0 |
| PTU-3-S | 15.0 |
| PTU-4O-S | 10.0 |
| PVG-5-S | 10.0 |
| PGU-3-S | 10.0 |
| PPU-3-S | 5.0 |
| PPU-4-S | 5.0 |
| PPU-5-S | 5.0 |
| PGIP-3-N | 15.0 |
| PPYP-4N | 15.0 |
| Σ | 100.0 |

[0217] This mixture has the following properties:

| | |
|---|--------|
| Clearing point (T(N,I))° C.: | 126.5 |
| Smectic to nematic transition point (T(S,N))° C.: | <-10 |
| n_e (20° C., 589.3 nm): | 1.9475 |
| Δn (20° C., 589.3 nm): | 0.4016 |

Use-example 8

[0218] A liquid crystal mixture is realized consisting of:

| Compound/Abbreviation | Concentration/mass-% |
|-----------------------|----------------------|
| PTG-5-S | 10.0 |
| PTU-3-S | 13.0 |
| PTU-4O-S | 10.0 |
| PVG-5-S | 11.0 |
| PGU-3-S | 10.0 |
| PPU-3-S | 5.0 |
| PPU-4-S | 5.0 |
| PPU-5-S | 5.0 |
| PGIP-3-N | 12.0 |
| PPYP-4N | 13.0 |
| PVG-V-S | 6.0 |
| Σ | 100.0 |

[0219] This mixture has the following properties:

| | |
|---|--------|
| Clearing point (T(N,I))° C.: | 125.0 |
| Smectic to nematic transition point (T(S,N))° C.: | <-10 |
| n_e (20° C., 589.3 nm): | 1.9623 |
| Δn (20° C., 589.3 nm): | 0.4153 |

Use-example 9

[0220] A liquid crystal mixture is realized consisting of:

| Compound/Abbreviation | Concentration/mass-% |
|-----------------------|----------------------|
| PG-3-AN | 8.0 |
| PU-3-AN | 7.0 |
| PU-5-AN | 7.0 |
| PPVU-2-S | 6.0 |
| PPVU-3-S | 6.0 |
| PGP-3-N | 6.0 |
| PGIP-3-N | 6.0 |
| PPYP-4N | 8.0 |
| PTP-3-S | 4.0 |
| PTG-3-S | 5.0 |
| PVG-5-S | 10.0 |
| PTPG-2-N | 4.0 |
| PPU-CL-S | 4.0 |
| PTP-2O-S | 4.0 |
| PTP-4O-S | 5.0 |
| PTG-2O-S | 5.0 |
| PTG-4O-S | 5.0 |
| Σ | 100.0 |

[0221] This mixture has the following properties:

| | |
|--------------------------------|--------|
| Clearing point (T(N,I))° C.: | 135.0 |
| n_e (20° C., 589.3 nm): | 1.9906 |
| Δn (20° C., 589.3 nm): | 0.4511 |

Comparative Use-example 1

[0222] A liquid crystal mixture is realized consisting of:

| Compound/Abbreviation | Concentration/mass-% |
|-----------------------|----------------------|
| K6 | 12.0 |
| K9 | 4.0 |
| K15 | 29.6 |
| M9 | 8.8 |
| T15 | 8.0 |
| PGIP-3-N | 20.0 |
| BB2I | 5.6 |
| BCH-5 | 12.0 |
| Σ | 100.0 |

[0223] This mixture has the following properties:

| | |
|-----------------------------------|--------|
| Clearing point (T(N,I))° C.: | 113.0 |
| n_e (20° C., 589.3 nm): | 1.8160 |
| Δn (20° C., 589.3 nm): | 0.2860 |
| $\epsilon_{ }$ (20° C., 1 kHz): | 22.8 |
| $\Delta\epsilon$ (20° C., 1 kHz): | 17.3 |

Comparative Use-example 2

[0224] A liquid crystal mixture is realized consisting of:

| Compound/Abbreviation | Concentration/mass-% |
|-----------------------|----------------------|
| ME2N.F | 10.00 |
| PPTUI-2-4 | 8.45 |
| PPTUI-3-2 | 5.16 |
| PPTUI-3-4 | 15.82 |
| PPTUI-4-4 | 35.54 |
| PPTUI-5-2 | 7.25 |
| PPTUI-5-4 | 17.78 |
| E | 100.00 |

[0225] This mixture has the following properties:

| | |
|-----------------------------------|---------|
| Clearing point (T(N,I))/° C.: | 145° C. |
| Δn (20° C., 589.3 nm): | 0.336 |
| η (20° C., 1 kHz): | 9.8 |
| $\Delta\epsilon$ (20° C., 1 kHz): | 6.5 |

Comparative Use-example 3

[0226] A liquid crystal mixture is realized consisting of:

| Compound/Abbreviation | Concentration/mass-% |
|-----------------------|----------------------|
| GGP-5-GL | 16.0 |
| PGIGI-3-CL | 6.0 |
| BCH-2.F.F | 14.0 |
| BCH-3.F.F | 15.0 |
| BCH-5.F.F | 14.0 |
| BCH-3.F.F.F | 14.0 |
| CGU-2-F | 6.0 |
| CGU-3-F | 6.0 |
| CGU-5-F | 6.0 |
| CBC-33F | 3.0 |
| E | 100.0 |

[0227] This mixture has the following properties:

| | |
|---|--------|
| Clearing point (T(N,I))/° C.: | 81.0 |
| Smectic to nematic transition point (T(S, N))/° C.: | <-30 |
| n_e (20° C., 589.3 nm): | 1.6711 |
| Δn (20° C., 589.3 nm): | 0.1603 |
| η (20° C., 1 kHz): | 14.6 |
| $\Delta\epsilon$ (20° C., 1 kHz): | 9.9 |

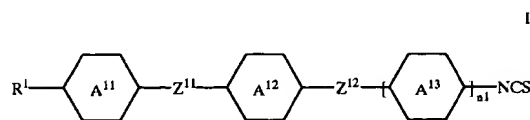
What is claimed is:

1. A liquid crystal medium, comprising:

a strongly dielectrically positive liquid crystal component A, containing one or more liquid crystal compounds with a terminal isothiocyanate group and having a Δn of more than 0.30 at 20° C. and 589.3 nm, and

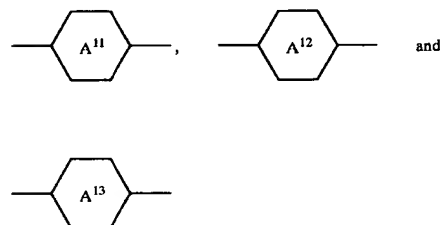
a dielectrically positive component B containing of one or more terminally polar substituted bi- or terphenyl compounds.

2. A liquid crystal medium according to claim 1, wherein the dielectrically positive liquid crystal component A comprises one or more compounds of formula I

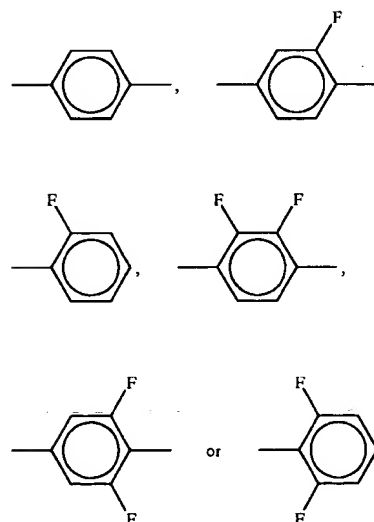


wherein

R^1 is n-alkyl, or n-alkoxy with 1 to 10 C-atoms, alkenyl, alkenyloxy or alkoxyalkyl with 2 to 7 C-atoms or CN, NCS, halogen, or alkyl, alkenyl, alkoxy, alkenyloxy or alkoxyalkyl substituted by one or more halogens,



Each, independently of each other, are



Z^{11} and Z^{12} each are independent of each other a single bond or trans $-\text{CH}=\text{CH}-$, provided that when n^1 is 0, Z^{12} is a single bond

n^1 is 0 or 1.